demonstration* that all the roots of the polynomial solution are real, the reader is referred to an article by Bôcher in the April number of the BULLETIN. The method which he has there employed I shall make use of to prove that the roots of the accessory polynomial φ are likewise real. Let P denote the polynomial solution and $x_1, \cdots, x_{n-1}$ the roots of its derivative which are, of course, real. If P be substituted in the differential equation and x be placed equal to a root a of φ, we get

$$P''(a) + \left(\frac{1-\lambda_1}{a-e_1} + \cdots + \frac{1-\lambda_r}{a-e_r}\right)P'(a) = 0,$$

or dividing by $P'(a)$,

$$\frac{1}{a-x_1} + \cdots + \frac{1}{a-x_{n-1}} + \frac{1-\lambda_1}{a-e_1} + \cdots + \frac{1-\lambda_r}{a-e_r} = 0.$$

If now a is an imaginary root $p + qi$ for which q is positive, the pure imaginary part of each fraction will have a negative sign. The equation therefore involves a contradiction. Hence

VIII. *The roots of the accessory polynomial φ of the differential equation* (8) *for a Stieltjes polynomial are all real and included between the two extreme singular points, e_1 and e_r.*

WESLEYAN UNIVERSITY,
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NOTE ON STOKES'S THEOREM IN CURVILINEAR CO-ORDINATES.

BY PROFESSOR ARTHUR GORDON WEBSTER.

(Read before the American Mathematical Society at the Meeting of April 30, 1898.)

THE expression for the curl of a vector point-function, when required in terms of orthogonal curvilinear coördinates, is usually obtained by direct transformation from their values in rectangular coördinates. The proof of Stokes's theorem given in my Lectures on electricity and magnetism, due to Helmholtz, can be easily adapted to curvilinear coördinates so as to prove the theorem independently of rectangular coördinates.

Let P_1, P_2, P_3 be the projections of a vector P on the

* The proof given by Stieljes in the sixth volume of the Acta Mathematica is based upon mechanical considerations.